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ABSTRACT

Educators and learners have diverse thinking style preferences. Recognition of this difference in preferences is very important in the design of a curriculum and the way it is taught. Educators are often unaware of the way learners think and learn. Cataloging and classification can only be taught effectively if the diversity in thinking style is taken into account. Innovative teaching practices should be used to facilitate creative problem solving by learners. Cataloging and classification require both systematic and logical thinking in the creation of bibliographic data and wider interpretative skills when assigning classification numbers and subject headings. The thinking style preferences of a group of second year learners in cataloging and classification at the University of Pretoria (South Africa) was determined by means of the Herrmann Brain Dominance Instrument (HBDI), resulting in a profile indicating potential competency. A variety of teaching strategies should be used to give learners insight into their own way of thinking and to apply this knowledge for self development. Taking the diversity of learning styles of the group of learners into consideration, the curriculum and teaching style should be adapted and the ensuing results evaluated in the third year of study to establish whether the thinking preferences of the same group of learners have changed. (MES)

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The thinking preferences of learners in cataloguing and classification: summary of a study of second year learners at the University of Pretoria

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Abstract

Educators and learners have diverse thinking style preferences. Recognition of this difference in preferences is very important in the design of a curriculum and the way it is taught. Educators are often unaware of the way learners think and learn. Cataloguing and classification can only be taught effectively if the diversity in thinking style is taken into account. Innovative teaching practices should be used to facilitate creative problem solving by learners. Cataloguing and classification require both systematic and logical thinking in the creation of bibliographic data and wider interpretive skills when assigning classification numbers and subject headings. The thinking style preferences of a group of second year learners in cataloguing and classification at the University of Pretoria, was determined by means of the Herrmann Brain Dominance Instrument (HBDI), resulting in a profile indicating potential competency. A variety of teaching strategies should be used to give learners insight into their own way of thinking and to apply this knowledge for self development. Taking the diversity of learning styles of the group of learners into consideration, the curriculum

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and teaching style should be adapted and the ensuing results evaluated in the third year of study, to establish whether the thinking preferences of the same group of learners have changed.

Paper

1. Introduction

The library and information profession has changed significantly. Information is available in many new formats. Technology is used in the organization and retrieval of information, as well as most other operations in library and information organizations. Although information workers still have to be well versed in traditional aspects of information service, they also have to acquire proficiency in the newest developments.

The Department of Information Science at the University of Pretoria is the department with the largest number of staff and learners in this field in South Africa. The number of learners enrolling for a degree in Library and Information Science has remained fairly consistent. This department has been revising curricula on a regular basis, trying to deliver learners able to find jobs and do the work required of them competently. Traditional content like cataloguing and reference work, are still taught although time allotted to teaching these skills has been reduced. The range of jobs for which learners must be equipped in this field, is however very wide in a country like South Africa, which is regarded as a developing country, with a sophisticated first world sector as well as a large third world sector. Learners have to be prepared for jobs ranging from advanced computer applications to community information services. At present core modules like information retrieval, information organization, management of information organizations, and user studies are taught within the curriculum for a degree course, with elective modules in more specialized topics that could address the various interests of learners and the need of the marketplace.

A number of library and information schools in South Africa have closed in the last few years. Some have changed their names, because the inclusion of the word "library" in the name is seen as detrimental to attract learners enrolling for courses in these departments. Traditional content, previously regarded as essential to prepare learners for careers in the information world, are gradually being phased out of courses. Consensus seem to be that the availability of computer systems has made knowledge of the traditional skills redundant. It is a debatable point. Although technology has largely eliminated duplication of effort in the field of bibliographic control and has take over many administrative and routine tasks, staff with knowledge and skills are still essential, even if less of them are required.

The education and training of cataloguers, has been debated consistently in the last few decades. The term cataloguing is used to encompass what is known as bibliographic cataloguing (using AACR2) as well as subject cataloguing (using LCSH for example) and classification (using DDC, LCC, UCD, etc.). At present it also requires knowledge of formats (eg. USMARC, UNIMARC) and knowledge of the system into which the data is to be entered. Standardization plays a crucial role in the exchange of bibliographic data and the necessities of resource sharing internationally. Authors like Michael Gorman have insisted consistently over the years that bibliographic control, which is achieved by creating catalogues at all levels, is the core of all library and information work (Gorman, 1992:694-697). Many information workers entering the profession are emphatic that they do not like cataloguing as such and would not like to become cataloguers. Knowledge of the principles of and skills in cataloguing operations is however used in almost all library and information work, and should remain part of professional education. Computer skills are also a prerequisite in most library and information organizations. In an article on required competencies of library and

information workers, communication skills and management skills are also rated as very important (Buttlar & Du Mont, 1989:3-18; Buttlar & Du Mont, 1996:45-62).

At the beginning of this year funds were obtained to try and establish what the characteristics of students who enrol for a degree in Library and Information Science are. Once this is known, teaching methods can be adapted to suit their thinking preferences. Their preferred thinking styles can then be utilized to teach the less preferred thinking styles and skills which are required by the profession.

2. Differences in thinking styles of educators and learners

Educators and learners both have diverse thinking styles. As more research in this field continues to be published it emphasizes the difficulty of teaching learners in traditional ways. People with different styles often don't understand one another, and such differences can fuel personal disagreements. Educators should take the different thinking styles of learners into consideration and design a curriculum incorporating a full spectrum of approaches and perspectives for learning opportunities acknowledging the diversity in preferences (Leonard & Straus, 1997:111-112). Teaching methods that do not correspond with thinking preferences might lead to resistance to learning.

In their research Leonard & Straus (1997:111-112) points out that the so called cognitive differences that exist could also be varying approaches to perceiving and assimilating data, making decisions, solving problems, and relating to other people. These approaches are synonymous with preferences and should not to be confused with skills or abilities. Preferences are not rigid. Most people can draw on a mixture of approaches and do not live their lives within narrow cognitive boundaries. They often stretch outside the borders of preferred operating modes if the conditions are right and the stakes are high enough. People tend to have one or two preferred habits of thought that influence their decision?making styles and their interaction with others (Leonard & Straus, 1997:112).

The most widely recognized cognitive distinction since the early seventies is between left?brained and right?brained ways of thinking. This categorization, although based on physiological evidence, is metaphorical, because it captures radically different ways of thinking (Herrmann, 1989:8-15, 31-34). An analytical, logical, and sequential approach to problem framing and solving (left?brained thinking) clearly differs from an intuitive, values?based, and nonlinear approach (right?brained thinking) (Leonard & Straus, 1997:112).

Thinking preferences are also revealed in different work styles, including decision?making and communication activities. Some people prefer to work in a group to solve problems, whereas others prefer to gather, absorb, and process information by themselves. Abstract thinkers, for instance, assimilate information from a variety of sources, such as books, reports, videos, and conversations, and prefer learning about something this way rather than experiencing it directly. Experiential people, in contrast, get information from interacting directly with people and things (Leonard & Straus, 1997:112). Some people evaluate evidence and make decisions through a structured, logical process, whereas another group rely on their values and emotions to guide them to the appropriate action (Leonard & Straus, 1997:112).

Various diagnostic tools and descriptive analyses of human personality have been developed to identify diverse categories of cognitive approaches. All the instruments however agree on the following (Herrmann, 1989:15-23; Leonard & Straus, 1997:113):

- Preferences are neither inherently good nor inherently bad. They are assets or liabilities depending on the situation.

- Distinguishing preferences emerge early in our lives, and strongly held ones tend to remain relatively stable through the years.
- We can learn to expand our repertoire of behaviours, to act outside our preferred styles, but that is difficult.
- Understanding others' preferences helps people communicate and collaborate.

Instruments with credibility such as the Myers?Briggs Type Indicator (MBTI[R]) or the Herrmann Brain Dominance Instrument (HBDI) help educators not only to understand their own thinking style preferences, but that of their learners as well. Communications should be tailored to the receiver instead of the sender. In a cognitively diverse environment, a message sent is not necessarily a message received. Some people respond well to facts, figures, and statistics. Others prefer anecdotes. Still others digest graphic presentations most easily. Information must be delivered in the preferred "language" of the recipient if it is to be received at all (Leonard & Straus, 1997:114)

Brain dominance leads to the development of preferences, which in turn establishes interests, which lead to motivation. This leads to the development of competencies, and influences our career choices and ultimately the work done (Case name: Technical, 1999:3) .

3. Herrmann Brain Dominance Instrument (HBDI)

Ned Herrmann started his research in 1976 as a result of his interest in defining the nature and origin of creativity. He attempted to develop an instrument with which brain dominance and thinking preferences could not only be identified but quantified. Each quadrant of this model by Herrmann (1989:411) (Table 1) represents a cluster of distinct thinking abilities and ways of "knowing". Each person embodies a coalition of these abilities in various proportions. Differences in thinking preferences are expressed in different vocabularies and in different problem solving outcomes. Thinking preference does not mean competence. We can learn to use our primary and secondary preferred modes more effectively through training, motivation and practice, and we can learn to strengthen less preferred modes (Lumsdaine & Lumsdaine, 1995:193).

Table 1: Four quarter whole brain model (Herrmann, 1989:411;Lumsdaine & Lumsdaine, 1995:193).

A	analytical logical fact based quantitative	innovative holistic conceptual thinking intuitive	B
C	sequential organized detailed planned	interpersonal sensory kinesthetic emotional	D

The whole brain can also be divided into four modes:

- left mode (quadrant A and B);
- right mode (quadrant C and D);
- cerebral modes (quadrant A and D) (cognitive, intellectual); and
- limbic modes (quadrant B and C) (structured, visceral and emotional) (Lumsdaine & Lumsdaine, 1995:203).

These modes function together, making up a whole brain in which one or more part become naturally dominant. The dominance between paired structures of the brain provides the basis for measuring the level of dominance. The HBDI is an assessment tool that quantifies the degree of a person's preference for specific thinking modes.

According to Herrmann, (1989,79-84), the different quadrants reveal four different ways of thinking and "knowing". Quadrant A thinking preference is associated with logical, analytical, and often bottom-line tough. No decision is made without the facts and reality is now. The B-quadrant is very detailed, structured, and solid, down-to-earth with no equivocation and ambiguity. The C-quadrant style is highly participative and team-oriented, and people are considered to be the most important asset. The D-quadrant is intuitive, holistic, adventurous, and risk taking (Case name: Technical, 1999:3).

To determine these preferences of individuals, a questionnaire consisting of 120 questions must be completed by an individual, either on computer or on paper. The completed surveys are entered in the HBDI scoring programme, and transmitted to their headquarters in North Carolina (USA) for scoring. Numerical results are returned by computer and is entered on the profile data sheet. Thinking preference is determined by the magnitude of preference in each quadrant (Overview, 1999:1).

4. The whole brain teaching approach

All four brain quadrants should therefore be involved in teaching and learning as indicated by the Herrmann Whole Brain Teaching and Learning Model - figure 1 (Note: Figure not available on-line. Please contact author). The four quadrants that are involved in effective learning are according to Lunsdaine & Lunsdaine, (1995:202):

Task	Quadrant
Memorising and synthesizing ideas and thinking process	C & D
Hands on projects and real-life design problems	B, C & D
Customer surveys	C & A
Searching for information	A & D
Verbal and written presentations	C
Using interactive software for solution optimization	D
Creative problem solving	A, B, C & D

The whole brain technique of teaching may take longer to prepare as an attempt has to be made to try and satisfy all areas of learning which should be incorporated into the presentation. These methods are not traditionally incorporated in teaching methods and are more acceptable to the developing of less preferred skills. Whole brain teaching is more interesting and gives scope for everyone to find learning interesting (Case name: Creating, 1999:5-6).

Learners retain information much better if it is presented in a way that appeals to them (figure 1 Note: Figure not available on-line. Please contact author). The educator should be aware of the lesser preferred quadrants of the learners and try to avoid presentations working mainly in that form (Case name: Creating, 1999:5-6). This makes both learners and educators more aware of others; their strengths and weaknesses and also more

tolerant (Case name: Creating, 1999:5-6).

From this model teaching strategies can be developed to enhance whole brain learning (Table 2).

Table 2 Learning and Design considerations (Herrmann, 1989:419)

A - UPPER LEFT		D-UPPER RIGHT	
Learns by:	**Learners respond to:**	**Learns by:**	**Learners respond to:**
• acquiring and quantifying facts • applying analysis and logic • thinking through ideas • building cases • forming theories	• formalized lectures • data based content • financial/technical case discussions • text books and bibliographies • programme learning • behaviour modification	• taking initiative • exploring hidden possibilities • relying on intuition • self discovery • constructing concepts • synthesizing content	• spontaniety • free flow • experiential opportunities • playfulness • future oriented case discussion • individuality • aesthetics • being involved
B-LOWER LEFT		**C-LOWER RIGHT**	
Learns by:	**Learners respond to:**	**Learns by:**	**Learners respond to:**
• organizing and structuring content • sequencing content • evaluating and testing theories • implementing course content	• through planning • sequential order • organizational and administrative case discussions • text books • behaviour modification • programme learning • structure • lectures	• listening and sharing ideas • integrating self experience with self • moving and feeling • harmonizing with content • emotional involvement	• experiential opportunities • sensory movement • music • people oriented case • discussions • group interaction

5. Results of the HBDI evaluation of second year learners registered for the degree - Bachelor in Information Science (Library Science)

The survey was completed during a special scheduled session. Twenty-seven learners participated. The surveys were processed and scored as a set. Some results are given in Table 3. The results were used to draw the group profile in figure 2 which gives an insight into the thinking preferences of this group of learners.

Table 3 Average scores of twenty seven second year learners

Quadrant	Upper left (A)	Lower left (B)	Lower right (C)	Upper right (D)
Preference	55	81	97	68
Choice	4th	2nd	1st	3rd
Generic code	2	1	1	1

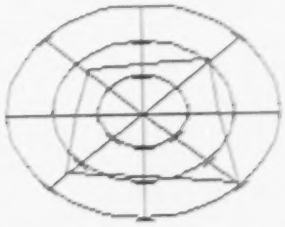
The scores in table 3 gives an indication of the primary preferences of the learners. The preference codes are identified as follows :

- "1" or "Primary" A score of 67 or above indicates a quadrant which enjoys thinking. A score above 100 indicates a very strong preference, often visible to others.
- "2" or "Secondary" A score of 34?66 represents thinking modes that are comfortable and available as necessary with relative ease (Overview, 1999:1).

This group profile (figure 2) is described by Herrmann (1989:388), as a triple dominant profile (2111) with two primaries in the right mode (C and D quadrants) and lower left (B quadrants). About 16% of the population falls within this profile. This group of learners prefer to use the Lower Right C quadrant (97) primarily, followed by the Lower Left B quadrant (81) and then the Upper Right C quadrant (68). The Upper Left A quadrant (55) is the least preferred modes of thinking. Another important aspect concluded form feature obtained from the information is the rank order of work elements (Figure 3). These work elements are those elements most preferred by the group.

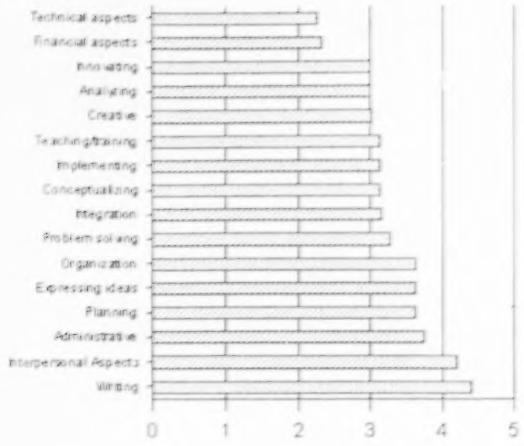
This profile is characterized by its multi-dominant and "generalized" nature, and fairly balanced amount of understanding and ability to use the three primary quadrants - the preferred processing modes being creative and holistic in Upper Right D, interpersonal and feeling in Lower Right C, and planning and organizing in the Lower Left B. The Upper Left Quadrant A is least preferred, but still the person is typically quite functional in their use of the logical and analytical aspects of this quadrant. This profile is typical of many personnel and human resources professionals, including educators, as well as those whose occupations require an understanding and ability to function on many levels, such as social workers, executive secretaries, and supervisory nurses (Herrmann, 1989:388).

Figure 2 Group average profile



The above profile displays a strong preference in the C quadrant (97). This implies a strong preference for the interpersonal, feeling based, emotional and spiritual thinking modes. The second most preferred quadrant is the B quadrant (81) with a preference for controlled, structured and organised thinking modes. The D quadrant is third most preferred quadrant (68) with creative, holistic and synthesizing modes. The least preferred quadrant is A (55) with a preference for analytical, rational, and logical processes.

Figure 3 Rank order of work elements



A careful study of the rank order of work elements (figure 3) together with the specific quadrant in which they are to be found gives a clear indication of the preferences of this group of learners is writing, interpersonal aspects and administrative work. It also give an indication of which areas need specific instruction, i.e. technical aspects, financial aspects innovating, and analysing.

6. Implication of the results of the HBDI for learners in cataloguing and classification

The results of the HBDI when applied to the group of learners identified previously, show that these learners do not possess the thinking preferences required to do cataloguing and classification. In many fields of the information profession, their preferred thinking styles will be an asset. Interpersonal skills are important when dealing with information users. The profile of thinking preferences of this group of learners reveals that their thinking preferences are mainly associated with the B and C quadrants. What cataloguers and those who do subject cataloguing and classification need, are analysing, problem solving, implementing and organization. Technical aspects are rated lowest, yet all aspects of bibliographic control rely heavily on technical knowledge and expertise. Knowledge of how catalogues and indexes work also forms the basis of many tasks performed by information workers. Problem solving abilities and technological proficiency are essential for most aspects of information work, but this group of learners do not prefer this thinking style.

From the results obtained in this project above it is clear that quite a few of the thinking preferences need to receive attention in the way the subject is taught. Teaching methods (table 2) should be adapted to use preferences to develop needed skills. Attempts must be made to utilize preferences to master skills related to those aspects for which a low preference is shown. During the second year of the Library and Information Science curricula, more attention will be given to the less preferred but essential preferences. The same group will be evaluated again next year, using the HBDI, to establish whether any meaningful changes have been achieved.

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